Space Weather Forecast

Issued on Wednesday, 07 June 2023 at 01:10 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate flares (R1/Minor-R2/Moderate radio blackouts). Slight chance of a G1/Minor Geomagnetic Storm 08/09 June.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Low. There are twelve sunspot regions on the visible disc, only two of which, both in the southern hemisphere, possess sufficient complexity for significant flares. One new region is emerging across the southeastern limb.
No Earth-directed Coronal Mass Ejections (CMEs) were observed in available imagery during the period. The most prominent CME on coronagraph imagery erupted from the Sun around 06/0300UTC but is expected to miss Earth.

Solar Wind / Geomagnetic Activity: Solar winds have shown evidence of some slight disturbance, thought to be linked to the passing of one or more weak Coronal Mass Ejections (CMEs). Wind speeds were initially at slow-ambient levels around 350 km/s, rising to a peak of 407 km/s at 06/1009UTC. Winds subsequently returned to slow-ambient levels and have been on a general downward trend and are currently around 350 km/s. The total magnetic field initially fluctuated between weak and moderate levels, but erratically declined to become weak. The important north-south component, Bz, although initially negative, has been largely weakly positive, with a few generally short-lived periods of negative Bz. Geomagnetic activity was mostly Quiet (Kp 0-2) with one Unsettled interval (Kp 3) 06/0000-0300UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary
Solar Activity: Solar activity is expected to remain generally Low with an ongoing, but steadily decreasing, chance of Moderate activity from Moderate flares. Very slight chance of isolated Strong flares.

Solar Wind / Geomagnetic Activity: A filament lift-off starting around 04/0900UTC from the southwest produced a Coronal Mass Ejection (CME). A glancing blow at Earth is possible from this feature, although not guaranteed, most likely Day 2 (08 June) but possibly Day 3 (09 June).
A second CME lifted off from close to the eastern limb around 06/0300UTC but is expected to miss, passing behind Earth on Day 4 (10 June). Generally solar winds expected to fluctuate between slow-ambient and slightly elevated levels. Perhaps seeing a slight enhancement Days 2-4 (08-10 June) should Earth experience any CME effects or the arrival of a weak stream of fast solar winds from a coronal hole.

Geomagnetic activity is forecast to be initially Quiet to Unsettled (Kp 0-3), with a slight chance of Active (Kp 4) intervals on Day 1 (07 June). Activity may increase Days 2-3 with any CME effects, becoming more Unsettled with a chance of Active intervals and a slight chance of isolated G1/Minor Geomagnetic Storm (Kp 5) intervals.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

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Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to be at background levels with solar radiation storms unlikely to occur. However, there is a very slight chance of reaching the S1/Minor Storm threshold should any larger flares occur.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	20	15	5
Strong	G3	No	1	2	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	45	40	30	30
Very Active	R3 to R5 X	No	5	5	3	3

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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